

What we claim is:

1. In a communication system including a first node, a second node, and a repeater that applies a known modification to a primary communication signal passing therethrough that identifies the repeater, where the first node receives a first signal from the second node either directly or via the repeater, and where the first signal includes a primary communication signal and, if the first signal is received from the repeater, also includes a signature signal that is a function of the primary communication signal and the known modification applied by the repeater,

the method of determining if a signal received by the first node is received directly from the second node or indirectly through the repeater, comprising the steps of:

receiving the first signal at the first node;
extracting the primary communication signal from the first signal;
producing a candidate signature signal as a function of the primary communication signal and the known modification applied by the repeater; and
determining whether the first signal has been received from the repeater by processing of the candidate signature signal and at least a portion of the first signal.

2. The method of Claim 1 wherein the communication system is a wireless communication system.

3. The method of Claim 1 wherein the first node is a network analysis system.

4. The method of Claim 1 wherein the first node is a geolocation system.

5. The method of Claim 1 wherein the second node is a mobile unit.

6. The method of Claim 1, wherein the primary signal is a uplink signal.

7. The method of Claim 1, wherein the primary signal is a downlink signal.

6. The method of Claim 1, wherein the aggregate signal is amplified such that the ratio of the primary signal to the signature signal is greater than unity.

7. The method of Claim 6, wherein the transmitted signature signal is 9db less than the transmitted primary signal.

8. The method of Claim 1, wherein the known modification is multiplication of a second signal.

9. The method of Claim 8, wherein the second signal is an AM Golay Hadamard sequence.

10. In a communication system including a first node, a second node, and a repeater, wherein the first node receives a first signal from the second node either directly or via the repeater, a method of applying a known modification to a signal to enable a determination of a signal received by the first node is received directly from the second node or indirectly through the repeater, comprising the steps of:

at the repeater receiving a primary signal and creating a signature signal as a function of the primary signal and a known second signal, wherein the second signal identifies the repeater, transmitting the primary signal and the signature signal as the first signal to the first node.

11. The method of Claim 10 wherein the communication system is a wireless communication system.

12. The method of Claim 10 wherein the first node is a network analysis system.

13. The method of Claim 10 wherein the first node is a geolocation system.

14. The method of Claim 10 wherein the second node is a mobile unit.

15. The method of Claim 10 wherein the known second signal is a Golay Hadamard sequence.

16. The method of Claim 10, wherein the signature signal is transmitted 9db or less than the primary signal.

17. In a wireless communication system having one or more repeaters, a first node and a second node, a method of determining if a signal received at the first node is received directly or via one of the one or more repeaters comprising;

 multiplying, at the one or more repeaters, a primary signal $s(t)$ received from the second node by $(1+r(t))$, where $r(t)$ is an AM Golay Hadamard sequence unique for each of the one or more repeaters to form the primary signal $s(t)$ and a signature signal $s(t)r(t)$ combined as an aggregate signal;

 transmitting the aggregate signal $s(t)(1+r(t))$ to the first node;

 detecting at the first node the primary signal $s(t)$;

 creating a set of candidate signature signals as a function of $s(t)$ and the AM Golay Hadamard sequences for the one or more repeaters;

 detecting one or more of the candidate signature signals $s(t)r(t)$ in the aggregate signal to thereby determine if the signal is received via the one or more repeaters.

18. The method of Claim 17, wherein the repeater transmitting the aggregate signal is identified by the AM Golay Hadamard sequence $r(t)$.

19. The method of Claim 17, wherein the one or more repeaters are synchronized.

20. The method of Claim 17, wherein the one or more repeaters are not synchronized.

21. The method of Claim 17, wherein the step of detecting the primary signal includes nulling the primary signal $s(t)$ from the aggregate signal.

22. The method of Claim 17, wherein the AM Golay Hadamard sequence is a repeated AM Golay Hadamard sequence.

23 A wireless communication system having a plurality of repeaters and a network overlay geolocation system, said geolocation system having a plurality of wireless location sensors for measuring an attribute of an uplink signal of a mobile appliance for determining the location of the mobile appliance based on the attribute and the location of the wireless location sensors, the improvement wherein each of the plurality of repeaters have an associated unique AM Golay Hadamard sequence and a signal multiplier for applying the associated unique AM Golay Hadamard sequence to a copy of the uplink signal received from the mobile appliance.

24. The system of Claim 23, wherein the geolocation system comprises a set of AM Golay Hadamard sequences corresponding to the associated unique AM Golay Hadamard sequences for each of the plurality of repeaters.

25. The system of Claim 23, wherein the plurality of repeaters are synchronized.

26. In a communication system including a first node, a second node, and a repeater that applies a known modification to a primary communication signal passing therethrough that identifies the repeater, where the first node receives a first signal from the second node either directly or via the repeater, and where the first signal includes a primary communication signal and, if the first signal is received from the repeater, also includes a signature signal that is a function of the primary communication signal and the known modification applied by the repeater,

the method of determining if a signal received by the first node is received directly from the second node or indirectly through the repeater, comprising the steps of:

receiving the first signal at the first node;

detecting the primary communication signal from the first signal;
producing a candidate aggregate signal as a function of the primary communication signal and the known modification applied by the repeater; and
determining whether the first signal has been received from the repeater by processing of the candidate aggregate signal and at least a portion of the first signal.

27. The method of Claim 26 wherein the first node is a network analysis system.
28. The method of Claim 26 wherein the first node is a geolocation system.
29. The method of Claim 26 wherein the second node is a mobile unit.
30. The method of Claim 26, wherein the primary signal is a uplink signal.
31. The method of Claim 26, wherein the primary signal is a downlink signal.
32. The method of Claim 26, wherein the first signal is amplified such that the ratio of the primary signal to the signature signal is greater than unity.
33. The method of Claim 1, wherein the first node is a mobile unit
34. The method of Claim 1, wherein the second node is a network analysis system.
35. The method of Claim 1, wherein the second node is a geolocation system.
36. The method of Claim 26, wherein the first node is a mobile unit
37. The method of Claim 26, wherein the second node is a network analysis system.
38. The method of Claim 26, wherein the second node is a geolocation system.
39. The method of Claim 23 wherein the first node is a network analysis system.
40. The method of Claim 23 wherein the first node is a geolocation system.
41. The method of Claim 23 wherein the second node is a mobile unit.
42. The method of Claim 23, wherein the first node is a mobile unit
43. The method of Claim 23, wherein the second node is a network analysis system.

44. The method of Claim 23, wherein the second node is a geolocation system.